REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

After entry of the forgoing amendment, Claims 1-24 are pending in the application. Claims 1 and 16 have been amended. Support for the substantive amendments to Claims 1 and 16 can be found at least on page 20, lines 9-13. Claims 20-24 have been added. Support for new Claim 20 can be found at least on page 21, lines 17-20. Support for new Claim 21 can be found at least on page 21, lines 1-12. Support for new Claims 22-24 can be found at least on page 18, lines 14-18. No new matter has been added.

By way of summary, the Official Action presented the following issues: Claims 1-19 stand rejected under 35 U.S.C. § 102 as allegedly lacking novelty with respect to Arnston et al. (U.S. Patent No. 4,128,005), hereinafter Arnston.

REJECTION UNDER 35 U.S.C. § 102

The Official Action has rejected Claims 1-19 as being unpatentable over Arnston. The Official Action states that Arnston discloses all of the claim limitations of the rejected claims. Applicant respectfully traverses the rejection.

Amended Claim 1 recites, *inter alia,* an abnormality diagnostic system including:

> "... the inherent data and common data corresponding to successively detected abnormal events being stored in order in which the abnormal events were detected."

By way of background, as automotive technology migrates away from traditional internal combustion engines toward electrically driven vehicles and/or hybrid vehicles, the associated electrical control systems necessary to implement these technologies become

increasingly more complex. As components of such systems wear and/or fail, it is helpful to employ an abnormality diagnostic system for use in pinpointing a specific cause or condition of the abnormal event[1]. Such systems are typically utilized for storing diagnostic data on-board the vehicle, such that upon taking the vehicle to a repair facility, the repair technician can access stored data to facilitate a cost effective repair/adjustment of the underlying cause of the abnormal event. Heretofore, data stored in on-board diagnostic systems have been of limited use in curtailing the troubleshooting process due to the general nature of the data provided. With this object in mind, a brief comparison of the claimed invention in view of Arnston is believed to be in order.

Arnston discloses an apparatus for comprehensively assessing the operating state of a vehicle engine. The apparatus (10) includes an input means (14), a central processing unit (16) and a display (18).[2]

In use, the Arnston apparatus is employed at a repair facility for diagnosing failures in engine components. For example, an engine (12) of a vehicle is operably linked to a plurality of sensor devices of the input means. The input means provides voltage signals representative of or proportional to water temperature, oil pressure, exhaust hydrocarbons and carbon monoxide, starter current, crank case blowby pressure, etc.[3] The processing unit cooperates with ROM memory (94) and RAM memory (96) to identify components which are not operating in accordance with specifications stored therein.[4]

As shown in Table 1 of Arnston, a diagnostic matrix (Boolean) is provided to identify

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[1] Specification, page 2, lines 1-14.

[2] Arnston at Column 2, lines 58-61; Figures 1-3.

[3] Arnston at Column 3, lines 1-7.

[4] Arnston at Column 4, lines 59-63.

faulty engine components. When a portion of the matrix is satisfied (i.e., logical conditions detected), such as the detection of low oil pressure and water temperature above 180°, the display instructs the repair technicians to replace the oil pump.[5] As can be appreciated, the Arnston device is only employed after a failure is detected by an operator of a vehicle, as the vehicle must be taken to a repair facility and be linked with the machine before the machine is able to provide any meaningful data.

An exemplary embodiment of the Applicant's diagnostic system includes a master control CPU (272) located on-board a vehicle which includes an abnormality judging section (272a), a data selecting section (272b), a writing section, (272c) and a reading section (272d).[6] The abnormality judging section functions to detect an abnormality in vehicle operation. The abnormality judging section identifies the abnormality in accordance with input signals. The writing section then obtains common data which is useful in diagnosing a vehicle abnormality regardless of the abnormality. Further, inherent data corresponding to the abnormal event is selected and obtained.

The detected abnormal event is typically presented at a dashboard display of the vehicle to alert the operator such that the vehicle can then be taken to a repair facility for clearing the event from memory and investigating the underlying cause. Successively occurring abnormal events are provided to the repair technician as a sequentially stored series of inherent and common data. In other words, Applicant's diagnostic system provides a method of reconstructing an operating history of the vehicle relative to the successive abnormal events. Arnston does not disclose an abnormality diagnostic system for identifying

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[5] Arnston at Column 5, lines 45-54.

[6] Specification at page 15, lines 17-20; Figure 3.

a detected abnormal event in which successively detected abnormal events are stored in order in which they were detected.

This is a novel aspect of the the exemplary embodiment of the Applicant's invention recited in claim 1, as amended. As the invention is able to provide history data to the repair technician prior to his/her analysis of the vehicle, repair time is decreased as the necessity of a comprehensive analysis is avoided. The repair technician no longer needs an apparatus such as disclosed in Arnston for a complete diagnosis of all engine functions in order to identify a cause of the underlying malfunction. Further, Applicant's system is capable of detecting abnormality events indicating wear and/or failure such that the complete failure of the component can be preemptively repaired in a cost effective manner such that complete disablement of the vehicle can be avoided. Not only does Arnston not disclose or suggest the storage of successive abnormal events in order in which they were detected, but teaches away from such a feature as the diagnostic device disclosed therein is not connected to the vehicle as abnormal events naturally occur.

Accordingly, it is respectfully submitted that Arnston does not anticipate the invention defined by Claim 1, as amended, nor any of the claims depending therefrom. Similarly, claim 16 recites substantially the same limitations as discused above, albeit in method form. Thus, Arnston does not anticipate the invention defined by Claim 16, as amended, nor any of the claims depending therefrom.

NEW CLAIMS

New Claim 20 recites *inter alia,* an abnormality diagnostic system including:

> "... a processor for identifying the detected abnormal event with a diagnostic code;...
> an inherent data storing section for storing data selectively obtained in

accordance with the diagnostic code, the data being identified as inherent data to the abnormal event."

Arnston does not disclose or suggest selectively obtaining inherent data in accordance with a diagnostic code. Claim 21 recites substantially the same limitation in method format.

Moreover, new dependent claims 22-24 are allowable at least based on their dependency from claim 1. Moreover, Claim 22 recites that the memory provided for storing abnormality diagnostic data is limited such that a vehicle operator is forced to take the vehicle to a repair facility in order to clear diagnostic data stored therein such that further diagnostic data can be obtained. Claim 23 recites abnormality diagnostic data of successive abnormal events are stored in different memory locations. Claim 24 recites that data is stored for substantially same abnormal events occuring successively. Applicant submits that Arnston does not disclose these more detailed aspects of the invention.

Accordingly, Applicant submits that Claims 20-24 are patentably distinguished over Arnston.

CONCLUSION

Consequently, in view of the forgoing amendments and remarks, it is respectfully submitted that the present application, including Claims 1-24, is patentably distinguished over the prior art, as in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

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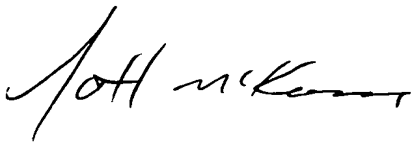

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Marked-Up Copy
Serial No: 09/845,179
Amendment Filed on:
8-8-02

IN THE CLAIMS

1. (Amended) An abnormality diagnostic system capable of storing abnormality diagnostic data [used for abnormality diagnosis] corresponding to an abnormal event [when an abnormality is] detected in a vehicle, comprising:

a common data storing section for storing as the abnormality diagnostic data for a plurality of abnormal events, common data which is common irrespective of a difference in the abnormal events; and

an inherent data storing section for storing as the abnormality diagnostic data, inherent data which is inherent to each of the events, the inherent data and common data corresponding to successively detected abnormal events being stored in order in which the abnormal events were detected.

16. (Amended) An abnormality diagnostic data storing method for storing, in a storing means, abnormality diagnostic data [used for abnormality diagnosis] corresponding to an abnormal event [when an abnormality is] detected in a vehicle, comprising the steps of:

judging an abnormal event when an abnormality is detected;

selecting at least inherent data which is inherent to the abnormal event; and

storing selected inherent data in the storing means as abnormality diagnostic data

corresponding to the abnormal event for a plurality of abnormal events, together with common data which is common irrespective of a difference in the abnormal events, the inherent data and common data corresponding to successively detected abnormal events being stored in order in which the abnormal events were detected.

20-24. (New).